# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/13379

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : C07H 21/04; C12N 1/04, 5/10, 15/00, 15/29, 15/82; A01H 1/00, 5/00 9/00, 11/00
US CL : 435/419, 440, 468; 536/23.6; 800/278, 290, 295

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/419, 440, 468; 536/23.6; 800/278, 290, 295

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, Agricola, Biosis; plant cyclin dependent protein kinase inhibitor, plant gene targeting

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | DOERNER, P. et al. Control of root growth and development by cyclin expression. Nature. 11 April 1996, Vol. 380, pages 520-523, whole document. | 1,2, 5-9 |
| Y | WANG, H. et al. ICK1, a cyclin-dependent protein kinase inhibitor from Arabidopsis thaliana interacts with both Cdc2a and CycD3, and its expression is induced by abscisic acid. Plant J. 1998, Vol. 15, No. 4, pages 501-510, especially pages 502-506. | 1-3, 5-9 |
| Y | VALANCIUS, V. et al. Testing an "in-out" targeting procedure for making subtle genomic modifications in mouse embryonic stem cells. Mol. Cell. Biol. March 1991, Vol. 11, No. 3, pages 1402-1408, whole document. | 1,3,5,6 |
| A | SHERR, C. et al. CDK inhibitors: postive and negative regulators of G1-phase progression. Genes and Develop. 1999, Vol. 13, pages 1501-1512, whole document. | 1,2, 5-9 |
| A | PINES, J. Cyclins and cyclin-dependent kinases: a biochemical view. Biochem. J. 1995, Vol. 308, pages 697-711, whole document. | 1,2, 5-9 |
| A | RENAUDIN, J. et al. Plant cyclins: a unified nomenclature for plant A-, B- and D-type cyclins based on sequence organization. Plant Mol. Biol. 1996, Vol. 32, pages 1003-1018, whole document. | 1,2, 5-9 |
| Y | WANG, H. et al. A plant cyclin-dependent kinase inhibitor gene. Nature. 03 April 1997, Vol. 386, pages 451-452, whole document. | 1,2, 5-9 |

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
31 August 2000 (31.08.2000)

Date of mailing of the international search report
26 SEP 2000

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PCT/US00/13379

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| P,Y | MENGISTE, T. et al. Prospects for the precise engineering of plant genomes by homologous recombination. Biol. Chem. July/August 1999, Vol. 380, pages 749-758, especially pages 752-753. | 1,3,5,6 |
| Y | US 5,750,862 A (P. JOHN) 12 May 1998, column 1, lines 1-43, column 3, lines 11-32, column 13, lines 11-19. | 1,8 |
| P,Y | WO 99/64599 A (AGRICULTURE AND AGRIFOOD CANADA) 06 December 1999, whole document. | 1,8 |

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PCT/US00/13379

**Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-3, 5-9

**Remark on Protest**
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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## BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s)1-3, 5-9, drawn to a polynucleotide targeting construct and a method for inactivating a D-like cyclin inhibitor via structurally disrupting the D-like cyclin inhibitor gene.

Group II, claim(s) 4, 10-14, drawn to an oligonucleotide and a method of antisence inhibition of the D-like cyclin inhibitor gene.

Group III, claim(s) 15-16, drawn to a nucleotide sequence encoding a plant D-like protein.

The inventions listed as Groups I-III do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The invention of Group I is taught or suggested by each of Wang et al., Mengiste et al., and John, and does not constitute an advance over the prior art, so does not constitute a special technical feature. Furthermore, the inventions of Groups I-III lack the same special technical features in that each of the DNAs that are claimed differ structurally and functionally and are used in different methods. The DNA of Group I is a targeting construct that is used for producing a hyperplastic variant plant by insertional inactivation of a gene, which is not a special technical feature of the DNAs or methods of Groups II-III. The DNA of Group II is an oligonucleotide that is used for increasing the growth rate of a plant by antisense inhibition of gene expression, which is not a special technical feature of the DNAs or methods of Groups I and III. The DNA of Group III is a polynucleotide that encodes a gene product, which is not a special technical feature of the DNAs or methods of Groups I-II. Therefore, lack of unity between the stated groups is properly made.